

Muon Facilities (Neutrino Factory) R&D



Beyond FY04

TIMESCALE

With about 10 years of reasonably well supported R&D the neutrino factory R&D community hopes to have a “cost effective” design, and to have prototyped & demonstrated the performance of all the critical components.

In about 10 years we will know more about the oscillation parameters, the cost of a Neutrino Factory (based on the R&D) and the geographical location of the Linear Collider.

Hence, the R&D program is focused on enabling the community, in about 10 years, to decide if, when, and where a Neutrino Factory should be built, and to know what it will cost.

MUCOOL Plan

FY04

Fill first LH2 absorbers

Prepare for 201 MHz RF tests

Design and get approval for Beamline to MUCOOL Test Area

FY05

Test 201 MHz cavity next 5T solenoid containing LH2 absorber

Build Beamline

Build Test Solenoid (that 201 MHz Cavity will fit within)

FY06-07

Test operation of 201 MHz cavity within new solenoid, and next to 5T solenoid containing LH2 absorber, when exposed to Linac beam. Start testing cavities and absorbers for MICE experiment.

MUCOOL: What's Needed

We have an MOU which promises the required laboratory effort to make use of the M&S coming from the Muon Collaboration for the initial MUCOOL test program (201 MHz high power cavity test next to a multi-Tesla solenoid that contains a liquid hydrogen absorber).

We would like laboratory support to push ahead with the MUCOOL Test Area beamline design, and a process that will enable the beamline to be constructed in FY05.

We anticipate enough M&S from the Muon Collaboration DOE funding to complete and test the first 201 MHz cavity and the first LH2 absorbers within the next two years ... but we are missing a solenoid for the 201 MHz cavity. We need 1.5 – 2 M\$ & have asked for supplementary funds from DOE for this. This is important to reduce the R&D risk for MICE !

Local Priorities: Contributing to the “World Design Study”

Reorganization in the Beams Division eliminates the department run by Mike Syphers which contained the only accelerator physicists in our local R&D group.

We understand that there will be a “Study Group” for our activity.

I believe that a “Study Group” aimed at contributing to the Neutrino Factory “World Design Study” would be a good thing ... but needs to be strong enough (4 FTE ?) to do something real. Perhaps it should include people from PPD and/or CD ?

We have a very active collaboration, with a reasonable track record, and very explicit goals for the coming few years (MUCOOL and Design Studies) and beyond (MICE).

The timescales are driven in part by the international nature of our R&D: MUCOOL is vital for MICE, and we want to contribute to the “World Design Study”.

At present our M&S comes from the DOE Muon Collaboration funding, with effort coming from the laboratory to execute the R&D. We are requesting that the laboratory (1) Builds a beamline to the MUCOOL Test Area, for use in 2 years time, and (2) Supports a Study Group strong enough to make a viable contribution to the Neutrino Factory “World Design Study”.